A Database Driven Website for A Commercial Vehicle Dealer

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Computing and Management
Session (2002/2003)

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SUMMARY

The Aim of The Report

To produce a database driven website that can be maintained by a non IT specialist for a commercial vehicle dealer. The company currently has a website but it has been under construction for over a year.

Minimum Requirements

The minimum requirements were agreed as follows:

- Website that displays a list of current vehicles in stock
- Database to hold stock with user friendly system for adding and removing vehicles.
- A requirements form on the website to allow customers to submit the vehicle type they are looking for.
- Training Manual for staff (Non IT specialist).
- Marketing of Website - Advice to client on how to get the site seen by customers.

In Addition to producing a website it was hoped that this project would help provide better structure and organisation of my client's vehicles. Research into the way my client operates was carried out. As a result, of this research provided the opportunity for recommendations to be made with a hope of making improvements.

The aims and objectives of this project were successfully completed and implemented. The website was created using ASP and Microsoft Access database. It was developed and tested from my personal web space but has since been moved to a host provider. The site can be found at the following address:

www.paceservices.co.uk

ACKNOWLEDGEMENTS

I would like to acknowledge all the people who have helped and supported me through this project. There are as follows

- My client, Clifford Scotchings for letting me undertake this project and for putting up with the constant phone calls.
- Bill Whyte for advice given in progress meeting.
- Friends and family. Special mention goes out to my mother and girlfriend for their encouragement, support and patience through this whole process.
- Andy Beanland for help setting up my server.

Thank you.

CONTENTS PAGE

1. INTRODUCTION…… 1

1.1. The Company…… 1

1.1.1. Organisation…… 1

1.1.2. Working Practices…… 1

1.1.3. The Need…… 1

1.2. The aims and Requirements…… 1

1.2.1. The Aim of the Report…… 1

1.2.2. Minimum Requirements…… 2

1.3. System Development…… 2

1.4. Deliverables…… 2

1.5. Scope of the Project…… 3

1.6. Structure of the Report 3

2. RESEARCHING PACE SERVICES…… 4

2.1. Research Methods…… 4

2.1.1. Questionnaires…… 4

2.1.2. Interviews…… 4

2.1.3. Method Selected…… 4

2.1.4. Observations of Competitors…… 4

2.2. Interview Results…… 5

2.2.1. Stock Control…… 5

2.2.2. Paceservices.co.uk…… 5

2.2.3. IT Resources…… 6

2.2.4. Website Brief…… 6

3. PACESERVICES.CO.UK REQUIREMENTS…… 7

3.1. Website Contents…… 7

3.2. Database Requirements…… 7

3.3. Maintenance Issues…… 7

3.4. Access Issues…… 8

3.4.1. Web Browsers…… 8

3.4.2. Authentication Issues…… 8

4. BACKGROUND RESEARCH…… 9

4.1. Database Architecture…… 9

4.2. Choosing Development Tools…… 10

4.2.1. Database…… 10
4.2.2. Scripting Language…… 12
4.2.3. HTML Editor…… 12
5. DESIGN AND IMPLEMENTATION…… 13
5.1. User Interface Design…… 14
5.2. Interface…… 14
5.3. Database Design…… 14
5.3.1. Pictures…… 15
5.3.2. Integrity…… 15
5.3.3. Security…… 15
5.4. Online Contact Form…… 16
5.5. Hosting…… 16
5.6. Problems Encountered on Implementation…… 16
6. EVALUATION…… 18
6.1. Unit Testing…… 18
6.1.1. Unit Testing Results…… 18
6.2. User Acceptance Testing…… 18
6.2.1. Advantage and Disadvantages of Usability Questionnaires…… 19
6.2.2. Questionnaire Design…… 20
6.2.3. User Acceptance Results…… 20
6.3. Future Work…… 21
6.3.1. Minor Tasks…… 21
6.3.2. Major Tasks…… 21
7. CONCLUSIONS…… 22
7.1. Conclusion…… 22
7.2. Reflection…… 22
REFERENCES…… 24

APPENDIX A – Project Schedule
APPENDIX B – Interview Transcript
APPENDIX C – Testing
APPENDIX D – User Manual
APPENDIX E – Marketing Report

1. INTRODUCTION

1.1 The Company

1.1.1 Organisation

Pace Services is a commercial vehicles and trailer unit's retailer. It was formed in Oct 1988 as a sole trader and is own by my client Clifford Scotching. The business is located in a commercial yard just outside Leighton Buzzard, Bedfordshire.

1.1.2 Working Practices

Currently the business operates with stock levels of between 20 – 30 vehicles/trailers. These are not all located at the base in Leighton Buzzard. Items not held at the base are usually stored at place of purchase and shipped to customers by use of delivery companies. Therefore my client relies heavily on pictures of vehicles as a selling point. The customer base is generally UK wide, but overseas customers are not unknown. There is no formal system of keeping track of items held, i.e. knowledge is held in my clients head.

1.1.3 The Need

Pace Services business activity relies heavily on the use of pictures and emails. Customers phone my client with a vehicle spec they desire and if an item is held in stock, pictures of the item will be emailed. If an item is not held my client will phone around contacts to find a vehicle matching, i.e. like a broker. These items may be located all over the UK and hence pictures allow my client to give customers an indication. As stated above my client's customer base is from the UK wide plus some international customers. Therefore development of the company website would give customers access to pictures of stock plus it may expand the companies foreign export trade.

1.2. The Aims and Requirements

1.2.1 The Aim of the report:

To produce a database driven website that can be maintained by a non IT specialist for a commercial vehicle dealer. The company currently has a website but it has been in under construction for over a year.

1.2.2 The Minimum requirements were agreed as follows:

- Website that displays a list of current vehicles in stock.
- Database to hold stock with user friendly system for adding and removing vehicles.
- A requirements form on the website to allow customers to submit the vehicle type they are looking for.
- Training manual for staff (Non IT specialist).
- Marketing of website - Advice to client on how to get the site seen by customers.

In Addition to producing a website it was hoped that this project would help provide better structure and organisation of my client's vehicles. Research into the way my client operates was carried out. As a result, this research provided the opportunity for recommendations to be made with a hope to make improvements.

1.3. System Development

In order to carry out this project successfully it was important that an outline of the different stages were highlighted and a timescale decided. These stages are summarized as follows:

1. Project Aim
2. Objectives, minimum requirements and deliverables
3. Background research
4. Full interviews with client to discuss design and confirm requirements
5. Produce database
6. Produce Website
7. Requirements Page
8. Testing and review of web site functionality
9. Produce marketing report
10. Produce training manual
11. Evaluating website and database with client
12. Writing of report

A Gantt chart of projects schedule can be found in appendix A.

1.4 The Deliverables

- Database driven website
- User manual
- Marketing report

1.5 Scope of Project

Due to my technical ability, beginner in all forms of web development, and the given time constraints, it was only possible to produce a basic but fully function website. There is much scope for development and improvement, of which I have agreed to work with my client.
It was the intention of this project to centre on the core requirements of my client. It provides the customers with all the necessary information and facilities for finding stock and a method for communication.

1.6 Structure of Report

The remainder of this report will be split into the following chapters:

Chapter 2: RESEARCHING PACE SERVICES
Discusses the research into Pace Services, providing an analysis of interviews.

Chapter 3: PACESERVICES.CO.UK REQUIREMENTS
Sets out the requirement for the website taking into consideration current resources and my client's requirements of the system.

Chapter 4: BACKGROUND RESEARCH
Research dealing with the selection of software and database architecture.

Chapter 5: DESIGN AND IMPLEMENTATION
Details the design of the website and the underlying database. Including issues dealing with security, maintenance and human computer interaction.

Chapter 6: EVALUATION
Deals with the testing and evaluation of the website and setting out a scope for future work.

Chapter 7: CONCLUSION
Draws a conclusion on the whole project with a personal reflection of the experience

Appendices:
Additional information including website manual, marketing report and interview write-ups.

2. RESEARCHING PACE SERVICES

2.1 Research Methods

The following research methods were considered:

2.1.1 Questionnaires

Questionnaires are an inexpensive way to gather data from a potentially large number of respondents. Often they are the only feasible way to reach a large number of reviewers that are graphically wide spread. Although regarded as inexpensive in terms of financial cost, they are timely process and require a great amount of design and analyses if they are going to be put to there maximum potential. Attention must be given to the format of the questionnaire, e.g. open or closed questions. Complex questions are difficult to ask and subjects are unlikely to be willing to spend a long time filling them in. The style of the questionnaire must be reviewed to confirm this is no opportunity for misleading or bias questions.

2.1.2 Interviews

In contrast, interviews allow for more complex questions to be discussed. You are able to build a rapport with the respondent and often observe as well as listen to what they have to say. It provides you with a means to lead the conversation in a direction you want so that you can get the answers you need. The one problem with the interview method is its inability to cater for people that are geographically wide spread. Also only suitable with a small sample rate.

2.1.3 Method Selected

With a sample size of one client, the use of questionnaires is inappropriate. The method would not allow me to gain all the information or understanding needed to establish an understanding of business practices and requirements. See interview transcript in appendix B.

2.1.4 Observations of Competitors

Observations of competitor's websites gave an indication of expectation regarding my project. A brief look at the following sites gave clear examples of layout, design and functions offered.

- http://www.chapmancommercials.co.uk/
- http://www.jgecommercials.co.uk/
- http://hometown.aol.co.uk/ruthjroberts/index.html
- http://www.truck-city.co.uk/
- http://www.geoff-sipson.co.uk/

2.2 Interview Results

2.2.1 Stock Control

There is no formal method that keeps tract of stock control. Details of items are kept in my client's memory with pictures held on 3.5" floppy disk. Stock is not always held in the yard in Leighton Buzzard and can be located throughout the UK.

2.2.2 Paceservices.co.uk

The company currently has a website, but this has been under construction for over two years. Freenetname.co.uk currently hosts the site, which allows Pop3 Mail Account, Domain Name Registration and 20Mb UNIX Web space.

Figure 2.2.2 www.paceservices.co.uk home page.

The website has never gone beyond this initial development stage and hence not been of any benefit to the company.

2.2.3 IT Resources

Hardware/Software - Paces services own one workstation PC. The system specification is as follows:

- 650 MHz Processor
- 256 MB ram
- 20GB Hard Drive
- Win 98
- Full Ms Office (including MS Access)
- All in one hp officejet printer

Pace Services uses an AOL Internet connection for many years now. Changing of the internet provider is not an option due to email address. My Client feels comfortable operating AOL and does not want to change.

IT Literacy standards are currently at a basic level, with my client feeling comfortable to perform the following actions:

- Windows navigation
- producing word documents
- basic Excel spread sheets
- Sending and receiving faxes
- internet browsing
- The use of WinZip
- Email including sending and receiving file attachments.

No experience or knowledge is held in the use of databases as with any html or web development tools. This includes FTP, which will have to be taken in account when producing the website and supporting documentation.

2.2.4 Website Brief

The requirements are listed section 1.2. In terms of the design and functionality, emphasis was put on simplicity and fast execution speeds. A criticism, put forward by my client, was the length of time some sites took to download pictures. He felt that people get frustrated with waiting times, resulting in abandonment.

3. PACESERVICES.CO.UK REQUIREMENTS

The purpose of this chapter is to take all the information from the research undertaken and my experience of systems analysis to produce the requirements of the website.

3.1 Website contents

The website should contain the following:

- Company logo.
- Company detail (Address, telephone, fax, email).
- A brief description about company.
- Database driven web page to display items for sale. Pictures of items must be included.
- An online form for contacting Pace Services.

3.2 Database Requirements

The underlying database will need the following:

- Flexibility to cope with different types of stock.
- Ability to interaction with an appropriate scripting language, to build the web pages.
- Allow data queries, i.e. with stock information retrieval.
- Allow insertions, deletions, editing from its contents.
- Allow authentication.

3.3 Maintenance Issues

The main issue that resulted in Pace Services current web offering being left uncompleted was the maintenance issue. Due to my client not having any technical expertise and not having the resources to be constantly pay out for this service, it is important that any maintenance of the website can be executed easy and effective as possible. Maintenance tasks will allow for adding, deleting and editing of stock information.

3.4 Access Issues

Users of this website are geographically widespread and there is therefore no way to determine the platform or browser that they will be using. Therefore the following issues must be considered.

3.4.1 Web Browsers

The two must commonly used browser today are Microsoft Internet explorer and Netscape Navigator. It is important to note that while these are both based around the HTML 4 standards set by the W3 consortium there are still a number of differences in how they display web page contents. It is for this reason that the website has been designed to try and avoid browser specific features.

3.4.2 Authentication Issues

Whilst the website is going to be accessibly by all the maintenance pages will only be accessed by my client. In order to restrict these pages, authentication procedures will have to be put in place. The most suitable will be the use of usernames and passwords. They may be more secure and advance systems but these are beyond my technical expertise and beyond what I and my client feel is necessary.

4. BACKGROUND RESEARCH

The purpose of this chapter is to provide a technical specification to meet the requirements stated in previous chapter. I shall justify choice in development tools by looking at the each specific area of design in turn.

4.1 Database Architecture

A commonly used view of data approach is the three-level architecture suggested by ANSI/SPARC (American National Standards Institute/Standards Planning and Requirements Committee). ANSI/SPARC produced an interim report in 1972 followed by a final report in 1977. The reports proposed an architectural framework for databases. Under this approach, a database is considered as containing data about an *enterprise*. The three levels of the architecture represent three different views of the data:

- *External* - The external level is the view that the individual user of the database has. This view is often a restricted view of the database and the same database may provide a number of different views for different classes of users.
- *Conceptual* – The conceptual level is the representation of the database in abstract form, describing the structure of the database to the relevant user groups but not the data that is stored.
- *Internal* - The internal view is the view about the actual physical storage of data. It tells us what data is stored in the database and how. It is at this level all data manipulation takes place.

The three level database architecture, which is shown in figure 4.1, allows a clear separation of the information meaning (conceptual view) from the external data representation and from the physical data structure layout. A database system that is able to separate the three different views of data is likely to be flexible and adaptable, which results in data independence [1].

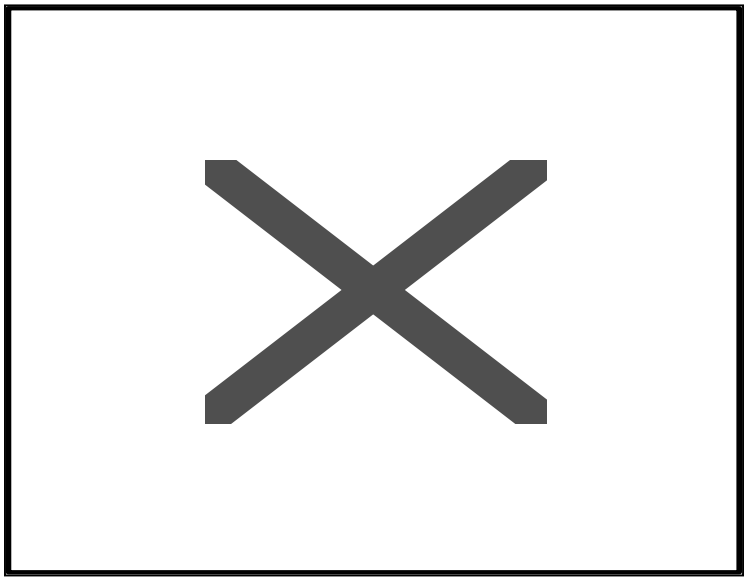

Figure 4.1 ANSI-SPARC three-level architecture

4.2 Choosing Development Tools

In order to create a database driven website the appropriate development tools need to be Selected.

4.2.1 Database

There are a number of DBMSs available to me that fit the database requirements that I laid out in the previous chapter (section 3.2). These include:

- MySQL
- PostgreSQL
- Microsoft SQL Server
- MS Access

The benefit and drawbacks of each tool is summarized in table bellow. From the comparison, I feel MS Access is the most preferable option, mainly because of cost issue. My client does not have a budget for software licences and therefore SQL server was ruled out, and not having any user experience of PostgreSQL or MySQL consolidated my decision.

MS Asses meets all necessary requirements considering database size, financial resources and its ease of use. Concurrent usage of the database is not expected to exceed MS Access capabilities. If usage levels increase significantly the database should be moved onto an SQL server or other dedicated database server. This process can be performed quickly and easily via the Microsoft upgrade wizard.

	MS Access	Microsoft SQL Server	PostgreSQL	MySQL
Benefits	➢ Very easy to use ➢ Available on my PC and that of my clients ➢ Build in Front end facilities ➢ Wizard when used with FrontPage, for example Database connection wizard ➢ Supports 255 concurrent users.	➢ Indexing Functions for quick data retrieval ➢ Excellent support for multiple users ➢ Provision for websites ➢ In built graphical user interface, makes the application more intuitive ➢ Efficiency optimization tools for query design	➢ Free ➢ Indented for website use ➢ GUI available, but at a cost	➢ Free ➢ Extremely fast ➢ Indented for website use
Drawbacks	➢ No Indexing functions ➢ Slow with large databases ➢ Reputation for instability ➢ MS Office regularly updates with backward compatibility often a problem	➢ Licence required, which is relatively expensive for my clients resources.	➢ Less information available then other databases ➢ Text based ➢ Package not used before	➢ Doesn't support triggers or stored procedures ➢ Doesn't support integrity constraints ➢ Package not used before

4.2.2 Scripting Language

As the database would eventually reside on a host's server, a server-side scripting language was necessary to access the information contained within the database.
There are a number of different scripting languages available, but due to me inexperience and time constraints, I have only consider ASP or PHP.

"Active Server Pages (ASP) is a server-side scripting environment that you can use to create interactive Web pages and build powerful Web applications." [2]

"PHP is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML" [3]

These scripting languages are the two most prominent to date. ASP comes from Microsoft and works well with other Microsoft products such as IIS, SQL server and MS Access. ASP supports a number of programming languages, although VBScript and Java Script are the most commonly used. It is built around a COM-based architecture. PHP is provided free of charge under the GNU license, and a number of the UNIX variants include packaged support for this dynamic web page generator. It has a reputation for ease of use by experts. In terms of the development opportunity both languages provide a flexible powerful web development tool.

From my research, PHP seems to be the most desired option with advantages such as speed, cross platform migration and superior memory management. However, for the purpose of this project it was decided to use ASP, as the server the database will be developed on and the DBMS being used are Microsoft products. This may eradication of compatibility issues.

"Getting everything from one vendor has important advantages. For one thing, you have greater assurance that all the pieces are going to work with each other and with the software you are already using."[4]

4.2.3 HTML Editor

Taking into account my choices of scripting language and DBMS system, it was concluded that FrontPage offered the best solution. Advantage such compatibly with other Microsoft Products, database connection/manipulation wizards, html editor and easy of use were deciding factors.

5. DESIGN AND IMPLEMENTATION

5.1 User Interface Design

The success of a website is largely dependent on the format and contents of information displayed. The aim is to make the website as usable as possible. Nielsen specified a set of heuristics (guide lines) that are applicable to most interfaces. They are as follows:

1. **Visibility of system status -** The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
2. **Match between system and the real world** - The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
3. **User control and freedom** - Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
4. **Consistency and standards -** Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
5. **Error prevention** - Even better than good error messages is a careful design which prevents a problem from occurring in the first place.
6. **Recognition rather than recall** - Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another.
7. **Flexibility and efficiency of use** - Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
8. **Aesthetic and minimalist design** - Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
9. **Help users recognize, diagnose, and recover from errors** - Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
10. **Help and documentation** - Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large. [5]

It was thus essential to considered each of these issues when designing the website.

5.2 Interface

In order to achieve some consistency and standards, each page on the site was based around the same template. This template provided each page with a menu to the left, company information on top and the page data to the right. See figure 5.2.

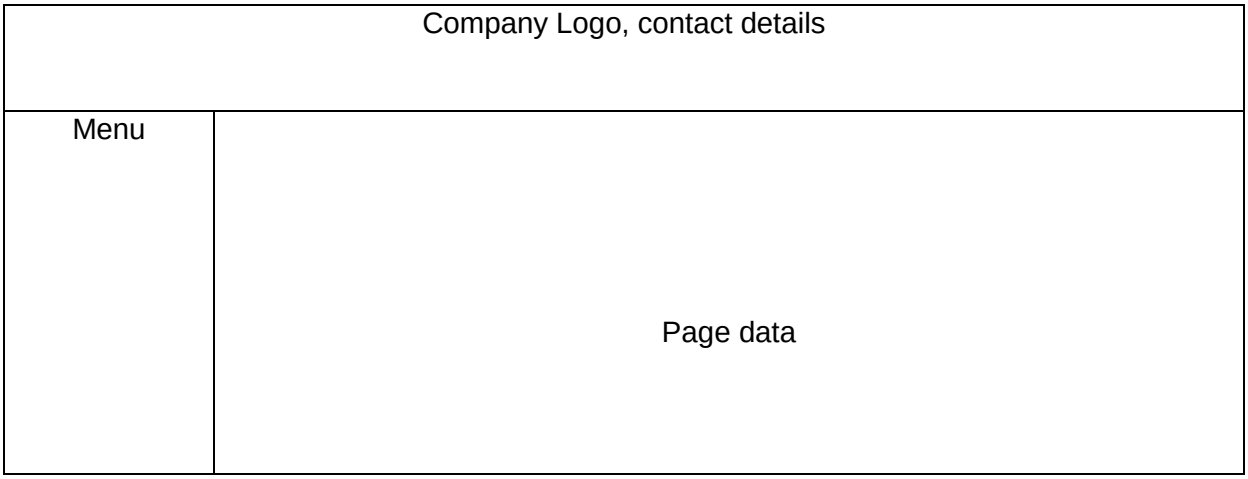

Figure 5.2 structure of interface

The website minimalist design was achieved by only including relevant information and restricted use of colours. I believe this interface achieve my clients desire for simplicity. See (3.2.3 Website brief).

Navigation through the sites confides with the three click rule, which states “The principle that it should take no more than 3 clicks to access any feature, content or each logical step in a process.” [6]

5.3 Database Design

The initial stage of the design process was to identity all of the data fields including its size, type, default value and source.

Field Name	**Size**	**Type**	**Default Value**	**Source**
StockID	10	Text	N/A	User Input
Make	20	Text	N/A	User Input
Model	20	Text	N/A	User Input
Type	20	Text	N/A	User Input
Year	Long Integer	Number	N/A	User Input
Description	255	Text	N/A	User Input
Price	15	Text	Please Contact	User Input

The information from the table above lead to the following schema:
Stock(**StockID**, Make, Model, Type, Year, Description, Price).

5.3.1 Pictures

One of the initial concerns of my clients was the speed the pictures took to download from websites. See (3.2.3 Website brief). This has been kept in mined when considering displaying images. To help reduce download time of pages it was decided to resize pictures before placing onto the server. This helped to keep the amount of server space down to a minimum and stop web browsers having to load full size images (slow to download) and then reduce the size.

In a MS Access database, pictures can be embedded or linked. Embedded object are Information (objects) that is contained in a source file and inserted into a destination file [7]. Whereas linked object are an object that is created in a source file and inserted into a destination file, while maintaining a connection between the two files [7].
On evaluation linked object types were chosen. This is mainly because there are easier to program and I believe embedded objects are currently beyond my abilities. The pictures are linked to the database by the StockID field. The pictures have a matching naming concept to the StockID and are held in a folder on the web server, called pictures. For example if a lorry has StockID = M623SWL, then the corresponding picture file will be named M623SWL.jpg. The link is then called with the following asp coding:

```
Response.Write("<td><img src=""/Pictures/" & objRS("StockID") & ".jpg"" width=""200"" height=""150""></td> ")
```

5.3.2 Integrity

This is concerned with accuracy and correctness of the data in the database. To ensure integrity I have enforced the following integrity rule. Each stock item must have a unique identifier or primary key. StockID is the Primary Key.

5.3.3 Security

By default MS Access allows read write access to all users. Therefore a username and password was created to restrict access. For security reasons these are not printed in this report. The user file is stored in a hidden folder that is not accessible to web browsers. To enhance security passwords should be changed regularly.

5.4 Online Contact Form

A requirement of Pace Services was to have a form on the website which visitors can fill in, with the results being emailed to them. The most popular method of sending email via a website is with the use of the CDO NTS component. This library allows server applications to send and receive messages without requiring access to the Microsoft Exchange Server. You can create programmable messaging objects, and then use their properties and methods for sending and receiving [8]. This is not the only option as CGI scripts (Common Gateway Interface script) were also considered. These are programs that are run on a Web server, in response to input from a browser [9]. However, the decision to use CDO NTS was due to it offering the best and easiest solution.

5.5 Hosting

At present Pace Services uses FreenetName.co.uk (see 3.2.2 Paceservices.co.uk). Unfortunately they do not offer any scripting language support, i.e. ASP or PHP, which means a new host server was required. Contenders for hosting were accessed in terms of the following criteria:

- Cost – From discussions with my client a limited of £50 per annum.
- Domain name transfer – As Pace Services currently owns a domain name, my client wished for this to be transferred.
- Facilities offered – FrontPage extensions, MS Access, and form mail were all required.
- Customer services – My client wished to have a support backup after development in case of problems.

My source of hosting companies came from aspin.com, an ASP resources index. The initial selection went to 7Host.com. Unfortunately this had to be cancelled due to technical issues the company had with .co.uk domain name transfers. After evaluating the alternatives smartchoicenet.co.uk was selected. The packages opted for included, ASP Support, FrontPage extension, MS Access, 10 MB of server space and Domain name transfer facilities.

5.6 Problems Encountered on Implementation

Throughout Implementation they were a number of problems that arose. In general, issues that came to light were mainly down to my inexperience in ASP Programming. Some of the issues are outline below.

- Pictures of stock – As mentioned above it was decided to use a linked object type. However many hours were spent searching for errors that occurred. The root of the problem was simple syntax errors.
- Migration of website – Transferring of website to host server resulted in numerous errors due to location of pages, database etc being altered.
- Delays in Domain name transfer – Despite being promised a 10 day turn around for paceservices.co.uk domain name to be transferred from current host, Freenetname.co.uk, admin delays lead to delays in the testing schedule.

6. EVALUATION

Once implementation is complete, it is important to test the website. There are two different types of testing that should be carried out. Unit testing is carried out first and is designed to ensure that there are no bugs or errors in the website and that it works in the way it is designed to. This is checking the level of validation. The second type of testing is user acceptance testing, which checks whether or not the website is of use to the intended users, i.e. Pace Services and its clients. This is checking the level of verification [10].

6.1. Unit Testing

Unit testing is concerned with the basic functionality of the website. It involves carrying out tests that attempt to cause errors and seeing whether or not the response is useful. This is very important to check as otherwise anomalies and problems may occur for my client and his customers. This may discourage them from using the site. As software development is an iterative and fluid process, I have been performing unit testing throughout the development, i.e. when an ASP page was created, testing was implemented before moving on to a new page. This means that my final unit testing should be relatively straightforward and any errors that arise will be due to either over sight when first developing the files or a problem caused by migration from development server to the new host's server. To carry out my final unit testing I systematically went through the entire website and tried out different inputs the users could provide that may create an error in the website.

6.1.1 Unit Testing Results

My full unit testing results are in Appendix C. To summarise, I found that my Website generally worked as expected. If important fields weren't filled in or invalid characters were entered then the data would not be sent to the database and an error message appeared. The only exception to this was the year field, which when not entered a value of "0" appeared. This was easier rectified by removing this default value.

6.2 User Acceptance Testing

User acceptance testing is important to carry out as otherwise the implemented website may work perfectly but may not be of actual use to Pace Services. "User acceptance testing involves testing whether or not the users can operate the system and find it acceptable, as well as examining the implementation against the original user requirements" [9]. Therefore it is vital to get an evaluation from my client, firstly to ensure that all elements set out in the

minimum requirements have been developed and secondly to gain an indication of customer satisfaction with the end results.

Usability has a wealth of research behind the many methods available for example, field observation, surveys, questionnaires and journaled sessions. However, when relating my project to the advantages and disadvantages of questionnaires it was concluded to be the most relevant, quickest and easiest method.

6.2.1 Advantages and Disadvantages of Usability Questionnaires

In general the biggest single advantage is that a usability questionnaire gives you feedback from the point of view of the user. If the questionnaire is reliable, and you have used it according to the instructions, then this feedback is a trustworthy sample of what you (will) get from your whole user population. Another big advantage is that measures gained from a questionnaire are to a large extent, independent of the system, users, or tasks to which the questionnaire was applied. You could therefore compare the perceived usability of a word processor with an electronic mailing system, the ease of use of a database as seen by a novice and an expert user, the ease with which you can do graphs and statistical computations on a spreadsheet. Additional advantages are that questionnaires are usually quick and therefore cost effective to administer and to score and that you can gather a lot of data using questionnaires as surveys. And of course, questionnaire data can be used as a reliable basis for comparison or for demonstrating that quantitative targets in usability have been met.

The biggest single disadvantage is that a questionnaire tells you only the user's reaction as the user perceives the situation. Thus some kinds of questions, for instance, to do with time measurement or frequency of event occurrence, are not usually reliably answered in questionnaires. On the whole it is useful to distinguish between subjective measures (which is what questionnaires are good for) and performance measures (which are publicly-observable facts and are more reliably gathered using direct event and time recording techniques). There is an additional smaller disadvantage. A questionnaire is usually designed to fit a number of different situations (because of the costs involved). Thus a questionnaire cannot tell you in detail what is going right or wrong with the application you are testing. But a well-designed questionnaire can get your near to the issues, and an open-ended questionnaire can be designed to deliver specific information if properly worded.

6.2.2 Questionnaire Design

According to Jurek Kirakowski, a research from the Human Factors Research Group, Ireland to design your own questionnaire you have to have a lot of time, patience, and resources.

He also advised to do a course in psychological measurement, including a heavy dose of statistics beforehand. Therefore as none of the above is held, it was decided to base my questionnaire chin at el “Questionnaire for User Interface Satisfaction” (see Appendix C). This evaluated the website in the following areas:

- Functionality – Testing all the minimum objective been met and work correctly.
- Screen Designs –Characters, layout etc
- Terminology and System Information – Error messages, terminology.
- Learning – Looking at ease of maintenance including rating of the training manual.
- System Capabilities – Reliability, speed etc.
- Overall Reaction – Easy of use, satisfaction etc

6.2.3 User Acceptance Results

Before asking my client to fill in the questionnaire, a two week training period was allowed for my client to experience the system working. A two week time period was chosen due to time restrictions in completing this report. Ideally to gain a fairer analysis of the software I would have liked to ask my client to repeat the questionnaire perhaps a month or two down the line and compare the results. Unfortunately this could not be the case.

To analysis the results a percentage system was used with the highest possible satisfaction score from each question being nine. For example if the section of learning had six questions with an average score of five, then satisfaction rating for that section would be 55% (100(30/54)).

The results per section were as follows:

Section	**Satisfaction Score**
Minimum Objectives	80%
Screen	77%
Terminology and System Information	66%
Learning	73%
System Capabilities	71%
Overall Reaction	77%
Total	**74%**

Positive / Negative Point made

- Add / Deleting / Editing Stock items very easy to perform.
- Time taken for stock page to download better than expected.

- System simplicity as whole. Client felt confident in his ability to maintain the website.
- My client felt that the suggestion made on the marketing report were beyond his current ability as and would need further help implementing.

6.3 Future Work

Although the website has been completed to specification, there are a number of improvements that could be made. These have been split in to major and minor tasks.

6.3.1 Minor Tasks

- Provide more information about Pace Services such as dealers facilities offered
- Opportunity for larger pictures of stock. For example on selecting of a stock item a new page could be loaded that gives more information plus a larger picture.
- Include site statistics such as page hit counter
- Current Stock page could be broken down into vehicle types for example view all rigids or tractor units.

6.3.2 Major Tasks

- Improved the security for database access. Although I believe the security is more than adequate there is vast room for improvement. Web development experience and time restriction prevent further researching in this area.
- Improve the add and delete features of maintenance pages to incorporate adding and deleting of pictures, for example an upload facility for adding.
- Develop an online search facility for stock retrieval. Currently stock levels normally reach a maximum of 30 items but if this was to increase it may become of some benefit.
- A useful addition would be an automatic backing up system for the database that would ensure better data recovery should the data be lost or corrupted.

7. CONCLUSIONS

7.1 Conclusion

The aim of this project was to develop and implement a database driven website that could be maintained by a non IT specialist. In order to achieved this, background research need to be undertaken into Pace Services business practice, IT literacy and the state of the current website. With this information to hand design, implementation and testing of the project began. On completion of the website, documentation included training manual and marketing report were produced and supplied to my client.

From the evaluation, the system can be viewed as a success. All the minimum requirements were achieved and my client showed a satisfaction rate of over seventy percent. However, as always there are still plenty of areas which can be improved and enhanced if time restrictions were permitting.

7.2 Reflection

The purpose of this section is to reflect on my personal experiences in completing this project. Overall it has proved to be a challenging but rewarding experience. At the start the only knowledge of web development came in the form of static HTML pages and managing SQL and Access databases. Active Server pages with Visual Basic had to be learned from scratch, although there is a great number tutorial available.

The project progress was fairly smooth, although some unforeseen delays that were out of my control did cause inconveniences. For example in transferring Pace Services domain name took nearly 4 four weeks which affected the time available for testing. Luckily a lot of the testing took place on my personal server.

In retrospect however, there are a few things I would have done differently if I had the time again. The following would be my recommendations:

1. When planning you project be sure to give enough time before breaking up for Christmas to complete background research. Although I started the process I believe I would have benefited vastly by having it completed ready to be analysis.

2. Don’t be afraid to get help. During implementation there were a few times when problems occurred due to my lack of experience. These problems turned out to be very minor but time could have been saved by not being afraid to ask the simple questions.
3. Do not be daunted by writing the project report and write the sections as you go along. For example once background research has been completed write the chapters up. By doing this you have what you did fresh in your mind.

One further bit of advice I would offer to someone embarking upon there final year project is to choose an area that you have a real interest and are motivated in. Having never done any web design before this project, my biggest personal objective was to learn more about web development and subsequently learn the scripting language ASP. There were many ups and downs along the way but I consider my achievements to be a personal success. I think it is fair to say that I have learnt a lot in the past year, and hope to use my experience in the future.

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Appendix A

Project Schedule

Elements	SEMESTER 1						VACATION				EXAM		SEMESTER 2									VACATION				
1						SUBMISSION		CHRISTMAS	VACATION	REVISION AND EXAMS									SUBMISSION							DEADLINE
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
Week	6	7	8	9	10	11	1	2	3	4	1	2	1	2	3	4	5	6	7	8	9	1	2	3	4	10

Project Elements

1 Project Aim
2 Objectives, minimum requirements and deliverables
3 Background research
4 Full interviews with client to discuss design and confirm requirements
5 Produce database
6 Produce Website
7 Requirements Page
8 Testing and review of web site functionality
9 Produce Marketing Report
10 Produce Training manual
11 Evaluating website and database with client
12 Writing of report

Appendix B

Interview Transcript

1) When was the company founded?
October 1988

2) What is your business format, i.e. sole trader?
Sole trader

3) What is your product range?
All sorts but the main range is Tractor units, rigids, and trailers

4) What stock levels do you generally keep?
About 20 to 30 max

5) Do you have any formal methods of keeping track of stock items?
No, just in my head

6) Can you summarises you business activity?
I advertise in truck trader and generally and people will phone enquiring. I normally will email if I have vehicles in stock. Other customer will phone with what they type of thing they are after. If I don't have anything sometime I act as a broker and find them a vehicle

7) So not all vehicles are kept in the yard?
No

8) You keep digital pictures of stock items?
Yes, they are jpegs

9) What computer hardware and software do you have?
A spec list of computer was produces

10) What type of internet connection do you have? And would you be prepared to change?
AOL and not really. I'm comfortable with using AOL plus would not want to change email now.

11) How do you regard you IT abilities?

Ok with Windows navigation, producing word documents, basic Excel spread sheets, Sending and receiving faxes, internet browsing, the use of WinZip and Email including sending and receiving file attachments.

12) Why has your current website been left uncompleted?

Did not want to be paying out for the site to be kept up to date and not able to do it myself

13) What would you like from your new website?

Page that list stock items with pictures

Online contact form for people to leave requests

Some thing I would be able to keep up to date

Some advice on how to increase visitors to the site

14) Are there any design issues such as colours etc?

Not really, prefer it to be simple affair. Don't like pages that take to long to download

15) Can you give me a description of your company for the home page of the website?

Forwarded at a later date

16) Who owns the domain name paceservices.co.uk?

I personally do

17) Who is the current site hosted with?

Spec sheet provided

18) Are there any financial restrictions with hosted a new site?

Yes, currently hosting is free but some but I know people paying about £50. So about there.

19) Have the companies you consider your competitors got websites?

Yes, most have. A copy of Truck trader was handed over and some competitors were pointed out.

20) Do you advertise anyway online?

Truck Trader has some, not all items online. I pay for company details on Yell to be enhanced.

Appendix C

Unit Testing Results

Usability Questionnaire

Unit Testing Results

Web Browsing

Test	Result
View paceservices.co.uk	Pass
View Current Stock page with pictures	Pass
View Contact us Page	Pass
Click on email link on home page loads new email	Pass

Administration pages

Test	Result
View Administration login page	Pass
Enter Correct Username and Password	Pass
Fails on entering Incorrect username Username	Pass
Fails on entering Incorrect Password	Pass

Add New Stock Items

Test	Result
View Add stock Form	Pass
Enter New Item correctly	Pass
Fails when enter all except StockID	Pass
Fails when entering a non integer in Year field	Pass
When fields left blank, they remain blank	Failed on Year field
Reset button works	Pass

Delete Stock Item

Test	Result
Select check box works	Pass
Delete select record button displays list of stock to be deleted	Pass
Cancel button works	Pass
Select Records are deleted	Pass

Edit Stock Item

Test	Result
Click on StockID brings up record detail	Pass
Edit button loads edit form with record details	Pass
Delete Button Deletes selected record	Pass
Fails when entering a non integer in Year field	Pass
Reset Button Works	Pass
New details are written to database	Pass

Contact Us Page

Test	Result
Enter details correct email received	Pass
Error message when first name missed	Pass
Error message when surname name missed	Pass
Error message when email address missed	Pass
Error message when incorrect email format entered	Pass
Error message when Enquiry missed	Pass
Clear button works correctly	Pass

Questionnaire for User Interface Satisfaction

Please rate your satisfaction with the system.

- Try to respond to all the items by marketing desired level with an ‘x’
- In Minimum objectives section please circle yes or no if the item in question has been achieved. If answer is yes please rate your level of satisfaction.
- At the end of the questionnaire there is some space for extra comments if required.

MINIMUM OBJECTIVE		Achieved			**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
1.	View pictures and details of items in stock	Yes	No	Poor											excellent
2.	Add/Delete or Edit Stock items	Yes	No	Poor											excellent
3.	Send and receive messages sent from online request form	Yes	No	Poor											excellent
4.	Received and used the training manual supplied	Yes	No	Poor											excellent
5.	Received and read marketing report	Yes	No	Poor											excellent
SCREEN					**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
6.	Reading characters on the screen			hard											easy
7.	Aesthetically pleasing			not at all											very much
8.	Organisation of information			confusing											very clear
9.	Sequence of screens			confusing											very clear
TERMINOLOGY AND SYSTEM INFORMATION					**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
10.	Use of terms throughout system			inconsistent											consistent
11.	Terminology related to task			never											always
12.	Position of messages on screen			inconsistent											consistent
13.	Prompts for input			confusing											clear
14.	Computer informs about its progress			never											always
15.	Error messages			unhelpful											helpful

LEARNING			**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
16.	Learning to operate the system	difficult											easy
17.	Exploring new features by trial and error	difficult											easy
18.	Remembering names and use of commands	difficult											easy
19.	Performing tasks is straightforward	never											always
20.	Help messages on the screen	unhelpful											helpful
21.	Supplemental reference materials	confusing											clear
SYSTEM CAPABILITIES			**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
22.	System speed	too slow											fast enough
23.	System reliability	unreliable											reliable
24.	System stability	terrible											wonderful
25.	Correcting your mistakes	difficult											easy
26.	Designed for all levels of users	never											always
OVERALL REACTION TO THE WEBSITE			**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
27.	The Website system is	terrible											wonderful
28.	The Website system is	difficult											easy
29.	The Website system is	frustrating											satisfying
30.	The Website system is	inadequate power											adequate power
31.	The Website system is	dull											stimulating
32.	The Website system is	rigid											flexible

List the most **negative** aspect(s):

1.
2.

3.

List the most **positive** aspect(s):

1.
2.
3.

Extra Comments

Appendix D

User Manual

PACESERVICES.CO.UK

A Guide to Maintenance

Author: Stuart Read

Date: April 2003

CONTENTS PAGE

1. INTRODUCTION……..2

1.1 The Database…..……..2

2. ACCESSING MAINTENANCE PAGE……..3

3. ADDING STOCK ITEMS……4

4. DELETING STOCK ITEMS……5

5. EDITING STOCK ITEMS……6

6. FTP PICTURES……7

6.1 Picture Folder……7

6.2 Image Preparation……7

6.3 FTP……8

1. INTRODUCTION

This manual has been produce to help guide you through maintaining your web site. Every effort has been made to reduce the complexity of this task with a web based add, edit and delete stock control system. However, in order for you to use these it is vital that you understand the basics of the website.

1.1 THE DATABASE

The database is made up of 7 fields, which are as follows:

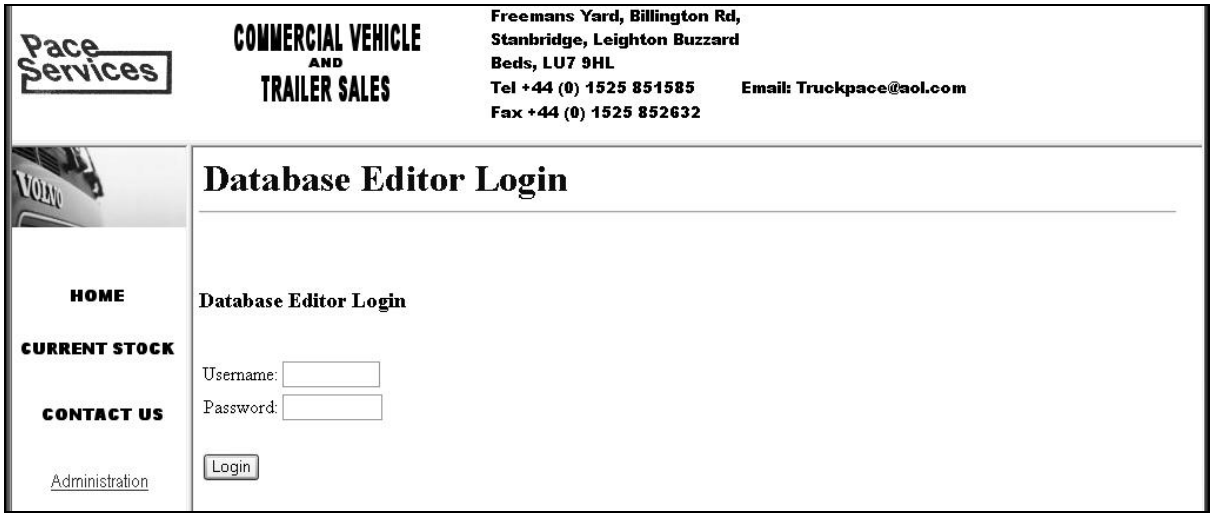
- StockID – This field represents a code which corresponds to the stock item. The recommendation is to use the vehicle registration number where possible. This field is very important and a required element when adding new items
- Make – e.g. Volvo
- Model - e.g. FH12
- Type – Trailer, Rigid, Tractor Unit or Other
- Year – Must be in number form, e.g. 1998
- Description – Maximum of 255 characters including spacing
- Price – Does not have to be in number form. This field has a default value.

Pictures of stock items are linked to the database by the StockID field and have a matching naming concept to the StockID. They are held in a folder on the web server, called Pictures. For example if a stock item has a StockID = M623SWL, then the corresponding picture file will be named M623SWL.jpg. This is very important that the name of the picture matches exactly to the StockID field entered into the database. The size of the pictures of stock must be resized to 200x150 pixels before placing on the web server (See FTP Pictures)

2. ACCESSING MAINTENANCE PAGE

To access the maintenance pages. Please follow the instructions listed below.

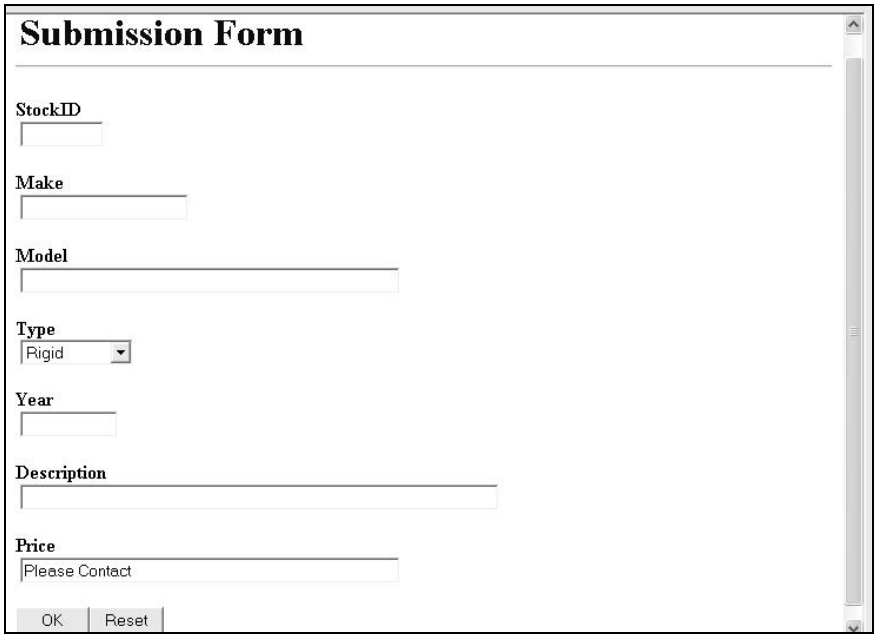
1. Open you home page in you web browser (Internet Explorer is recommended)
2. Left click with the mouse on the administration link located in the menu on the left of the page. The database login page will be loaded (see below)



3. Enter the supplied username and password and with the mouse left click on the Login box.
4. If login details are correct you will be transferred to the stock maintenance page. However if confronted with an Authorization Failed page, please check details provided and click on the please try again link.

3. ADDING STOCK ITEMS

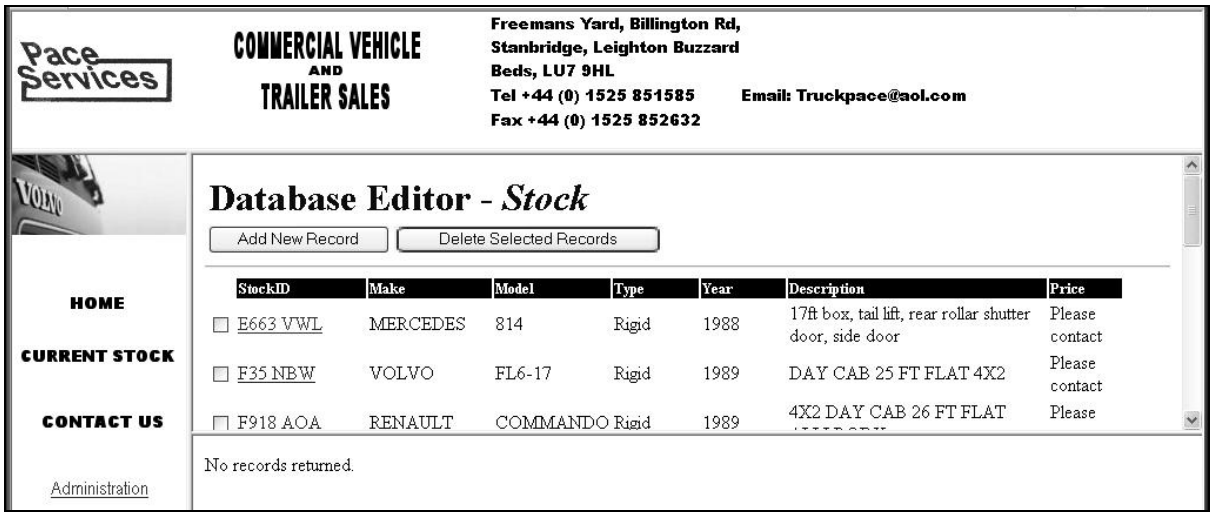
1. Access the maintenance pages of the website (see Accessing maintenance page).
2. A Submission page will be displayed in the bottom frame as below.



3. With the mouse, left click on the box under StockID and enter the new ID. Note an Important filed must be entered correctly (see Introduction).
4. To navigate between fields use the tab key or left mouse button.
5. When selecting the vehicle type, left click on the lookup box to display options and click on desired choice.
6. When all detail have been entered, please double check for errors as what is entered will be displayed.
7. On completion left click with the mouse on the ok box at the end of the page. A conformation message will be displayed if no errors have occurred.
8. Note Pictures of the vehicles must be adding to the web page separately (see FTP).

4. DELETING STOCK ITEMS

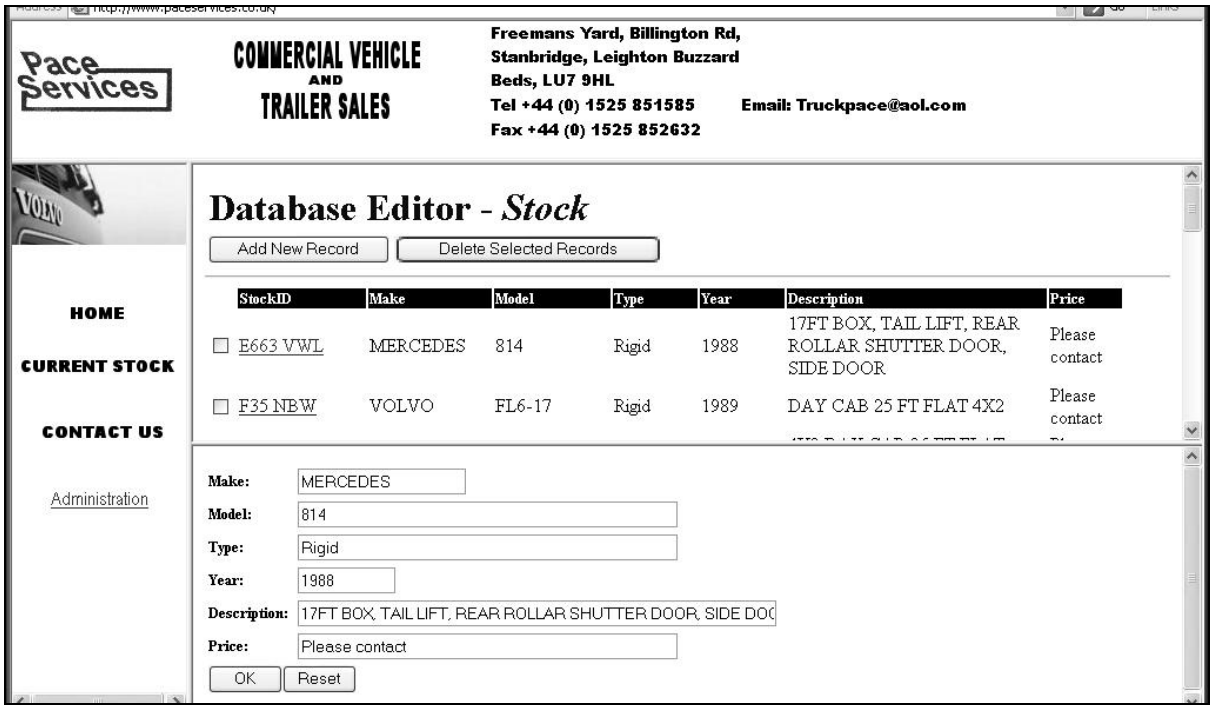
1. Access the maintenance pages of the website (see Accessing maintenance page)


Pace Services
COMMERCIAL VEHICLE AND TRAILER SALES
Freemans Yard, Billington Rd,
Stanbridge, Leighton Buzzard
Beds, LU7 9HL
Tel +44 (0) 1525 851585
Email: Truckpace@aol.com
Fax +44 (0) 1525 852632
Database Editor - Stock
Add New Record
Delete Selected Records
HOME
CURRENT STOCK
CONTACT US
Administration
StockID Make Model Type Year Description Price
E663 VWL MERCEDES 814 Rigid 1988 17ft box, tail lift, rear rollar shutter door, side door Please contact
F35 NBW VOLVO FL6-17 Rigid 1989 DAY CAB 25 FT FLAT 4X2 Please contact
F918 AOA RENAULT COMMANDO Rigid 1989 4X2 DAY CAB 26 FT FLAT Please
No records returned.

2. All Stock items listed are displayed. They are ordered by the StockID. Please scroll down the page to view records
3. To select which record to delete, left click with the mouse on the check box to the left of the StockID.
4. After all records being deleted have been selected scroll to the top of the page and with the mouse, left click on the box called Delete Selected Record.
5. The records selected with be displayed in the bottom half of the page. At the end of the selected records will be chance to cancel or conform the deletion. If the correct records have been chosen the left click on the ok box. Otherwise left click on the cancel box.
6. On selecting ok a conformation of deletion will be displayed. On selecting cancel you will be return to the page as above.
7. Note records deleted will still be displayed in the selection page until next time you login.
8. Note Picture of the stock items are not deleted at the process and have to be deleted from the Pictures folder on the web server (see FTP Pictures).

5. EDITING STOCK ITEMS

1. Access the maintenance pages of the website (see Accessing maintenance page).
2. All Stock items listed are displayed. They are ordered by the StockID. Please scroll down the page to view records.
3. To select records to edit, with the mouse left click on the StockID field corresponding to the record chosen.
4. The record details will be displayed in the bottom frame of the page. From this point you have the opportunity to delete or edit the record. Left click with the mouse on the edit or delete box depending on your requirements.
5. If edit box was selected the following page will be displayed.


Pace Services
COMMERCIAL VEHICLE AND TRAILER SALES
Freemans Yard, Billington Rd,
Stanbridge, Leighton Buzzard
Beds, LU7 9HL
Tel +44 (0) 1525 851585
Email: Truckpace@aol.com
Fax +44 (0) 1525 852632
HOME
CURRENT STOCK
CONTACT US
Administration
Database Editor - Stock
Add New Record
Delete Selected Records
StockID Make Model Type Year Description Price
E663 VWL MERCEDES 814 Rigid 1988 17FT BOX, TAIL LIFT, REAR ROLLAR SHUTTER DOOR, SIDE DOOR Please contact
F35 NBW VOLVO FL6-17 Rigid 1989 DAY CAB 25 FT FLAT 4X2 Please contact
Make: MERCEDES
Model: 814
Type: Rigid
Year: 1988
Description: 17FT BOX, TAIL LIFT, REAR ROLLAR SHUTTER DOOR, SIDE DOC
Price: Please contact
OK
Reset

6. To edit the record, left click with the mouse on the field to be altered.
7. On completion on editing, left click on the ok box and a conformation message will be displayed.
8. NOTE the reset button will restore the record to state before any editing took place.

6. FTP PICTURES

This section of the manual does not give you software specific instruction for Image preparation or FTP file but act as a reminder of the procedures that need to be undertaken. For software specific instruction consult the help pages or notes from our demonstration session.

6.1 Picture folder

Located on you desktop a folder called Pictures has been created to hold all resized pictures ready to be display on the website. As mentioned in the introduction these pictures are linked to stock items by the StockID field and must be named accordingly. For example a Volvo rigid has a StockID of L653HNV then the picture represent this item must be L653HNV.jpg.

This folder on your desktop represents pictures of the stock items that are to be display. It is therefore vital that this be kept up to date with the records held on the database. For example items that are to be removed from the website (see Deleting Stock Items) the corresponding picture must be deleted from the picture folder on the desktop. When adding stock the same process applies, the picture must be stored in the folder, ready for FTP (see bellow).

6.2 Image Preparation

1. Open picture in image editing software.
2. So that all images appear in the same format on the website, resize pictures to 200 pixels width, 150 pixels height.
3. Save resized pictures in you dedicated Picture fold located on your desktop. Ensure that pictures are saved by the corresponding StockID number. Please be careful to ensure that they matched exactly otherwise pictures will not be displayed (see Picture Folder).

6.3 FTP

For username and passwords please consult host literature supplied.

1. Open FTP software and open connection called PaceWeb. This connection was setup during your demonstration. If problems occur please contact host help session on FTP of files.
2. The connection mentioned above opens at the following address (see host literature): ftp.paceservices.co.uk/htdocs
3. Located within the above address is the Pictures folder. Providing the equivalent folder on your desktop has been updated with the correct pictures. The folder is ready to be updated.
4. Holding the left mouse button down click and drag the Pictures folder from your desktop (the desktop will be displayed in the left hand frame of the FTP software) to the web server page (frame to the right of the page).
5. On release of the mouse button a conformation will appear to upload and overwrite the folder. Choice ok to proceed.
6. Close connection and FTP software.

Note the above method is not the quickest method but, as discussed in our meeting, the easiest until you gain experience with your FTP software and the whole process. For example once confidence is built you may wish just delete pictures and add pictures directly within the folder and not replace it the whole folder.

Appendix E

Marketing Report

This document is aimed to give Pace Services a number of ideas of how to get people to view the site rather than to act as a marketing strategy for the company.

Why do people visit Web sites?

To start with, you must consider why people visit sites in the first place. Aside from the novelty of the "cool places to visit," people normally are looking for information on specific products, services, or subject matters. Just think of the reasons you visit sites, even while "surfing" the Web.

How do people find information?

In some cases people know the Web address or Web address of a site that has the information they want. They find out the Web address through newspaper and magazine articles, advertisements, and even business cards. In most cases though, they use one of the numerous search tools or engines, along with some keywords, to get a listing of possible sites to visit for the information they desire. Some search sites, such as Alta Vista and Excite, have a data base of key words within the text of the millions of documents on the Web. Other search sites, such as Yahoo, search mainly by classifying sites according to type. There are also "Yellow Pages" books listing Web sites, classified according to type of company, product line, or such.

What should you do?

First of all, you should state your Web address or Web address in all advertising that you do. This means not only in mass media advertising, but also having your Web address on your items such as business cards and letter headers. As Pace Services currently advertise with Yellow Pages website, it would be a good idea to add you web address to your enhanced listing. The next thing you should do to get people to visit your site is to submit your Web address with the various search engines, such as Yahoo, Infoseek Guide, WebCrawler, Excite, and google. Search engines make use of meta data stored in the header of web pages. In particular search engines examine abstract and keyword meta data. At present only keyword meta data is included on your site. To increase search rankings abstract meta data should also be included.

In conclusion

In order to get people to visit your Web site, you should advertise your Web address, submit your Web address to the various search tools, and make sure you have a good description and list of key words to attract people who are searching for information.